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SUPERSEDING
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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
SPECIFICATION

AIR ROUTE SURVEILLANCE RADAR (ARSR-3) BUILDING AND ENGINE GENERATOR SYSTEM

1. SCOPE

1.1 Scope.- This specification sets forth the technical requirements for design, fabrication, and integration of a transportable transmitter/receiver building and engine-generator system for Air Route Surveillance Radar (ARSR-3) facilities. This specification is to be used with Specification FAA-E-2483b, Air Route Surveillance Radar (ARSR-3).

1.2 Objective.- The FAA recognizes the technical and economic advantages of the following procurement concepts and the contractor shall exercise them in his design.

(a) Quantity procurement of materials and equipment.

(b) Modular and prefabricated construction procedures.

(c) Design freedom for advantageous application of the latest manufacturing, assembling, and erecting techniques.

The contractor's services shall satisfy these objectives and be in strict accordance with all requirements contained herein.

2. APPLICABLE DOCUMENTS

2.1 FAA documents.- The following FAA orders, standards, and specifications of the issues specified in the invitation for bids or request for proposals, form a part of this specification and are applicable in their entirety unless otherwise specified herein. This specification shall take precedence in the event of conflict.

2.1.1 FAA orders

6950.9	Facility Emergency Lighting

2.1.2 FAA standards

FAA-STD-002	Federal Aviation Agency Standard for Engineering Drawings
FAA-STD-003	Paint Systems for Structures
FAA-STD-005	Preparation of Specification Documents
FAA-STD-012	Paint Systems for Equipment
FAA-STD-013	Quality Control Program Requirements

2.1.3 FAA specifications

FAA-C-1217	Electrical Work, Interior
FAA-E-2083	Bypass Switch, Engine Generator
FAA-1353 and Supp. No. 136	Load Bank, Outdoor Type, with Switching Cabinet (175 KW, 208V, 3 Phase)
FAA-C-1244	Installation of Engine-generators and Fuel Tank
FAA-E-2204	Engine-generator Sets, 5KW to 300KW
FAA-C-2256	Temperature and Humidity Control Equipment
FAA-E-2483b	Air Route Surveillance Radar (ARSR-3)
FAA-C-2498	Air Route Surveillance Radar (ARSR-3) Antenna Tower
FAA-D-2494/1	Instruction Books, Preparation of Manuscripts
FAA-D-2494/2	Instruction Books, Preparation of Manuscript Copy

(The FAA documents cited above may be obtained from the Contracting Officer in the Federal Aviation Administration office issuing the contract. Requests should fully identify the material desired and should cite the contract involved and use to be made of the requested material.)

2.2 Military and Federal specifications.- The following Military and Federal publications, of the issues in effect on the date of the invitations for bids or request for proposals, form a part of this specification. This specification shall take precedence in the event of conflict.

2.2.1 Federal specifications

SS-T-312	Tile, Floor; Asphalt, Rubber, Vinyl, Vinyl-Asbestos
WW-P-541/1	Plumbing Fixtures (Water Closets, Land Use)
WW-P-541/4	Plumbing Fixtures (Lavatories, Land Use)
WW-P-541/8	Plumbing Fixtures (Accessories, Land Use)
W-H-00196G	Heater, Water, Electric, Residential

2.2.2 Military specification

MIL-F-16081E	Fans, Ventilating, Propeller

2.2.3 Federal standard.- Department of Labor, Title 29, Chapter XVII, Part 1910, Occupational Safety and Health Standards.

(Information on obtaining copies of Military and Federal specifications and standards may be obtained from General Services Administration offices in Washington, D.C., Seattle, San Francisco, Denver, Kansas City, Mo., Chicago, Atlanta, New York, Boston, Dallas and Los Angeles.)

2.3 Other publications.- The following publications of the issue in effect on the date of the invitation for bids or request for proposals shall form a part of this specification. This specification shall take precedence in the event of conflict.

2.3.1 Uniform Building Code, Volume I, current edition.- International Conference of Building Officials, 50 South Robles, Pasadena, Calif. 99101.

2.3.2 Heating, Ventilating, and Air Conditioning Guide and Data Book.- American Society of Heating, Refrigeration and Air Conditioning Engineers, 345 East Forty-seventy St., New York, N. Y. 10017.

2.3.3 National Electrical Code.- Publication No. 70, National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. 02110.

2.3.4 National Plumbing Code.- Publication No. A40.8, American National Standards Institute, 1430 Broadway, New York, New York 10018.

2.3.5 IES Handbook.- Illuminating Engineering Society, 1860 Broadway, New York, New York.

2.3.6 ASTM Standards.- American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

2.3.7 Underwriters Laboratory Standards.- Underwriters Laboratories Inc., 1285 Walt Whitman Road, Melville, Long Island, New York 11746.

UL Std No. 250 Refrigerators and Freezers, Household

2.3.8 Household Automatic Storage-Type Water Heaters.- Publication ASA C72.1, American National Standards Institute, Inc., 1430 Broadway, New York, N. Y. 10018.

3. REQUIREMENTS

3.1 General.- The contractor shall design and provide an ARSR-3 building and standby power system with shelter. The scope of design shall include layout, fabrication, transportation, site construction, and installation. Hereinafter, all references to "shelters" shall apply to both ARSR-3 building and E/G shelter unless specifically differentiated. The buildings and installed support systems shall be designed as similar modular, prefabricated, or preconstructed components which can be joined together at the establishment site to form the complete building system. The shelters shall be designed for an intended useful life of 20 years, and shall be structurally capable of relocation without major repair. Exterior maintenance for the first 20 years shall be limited to minor repairs and caulking. Interior maintenance shall be limited to cleaning, minor repairs, and light bulb replacement during the normal functional operation of the facility for the useful 20-year life. Repainting and reroofing shall not be required. The structural design, material selection, foundation design, and protective finishes shall comply with current good engineering practice and, in addition, meet or exceed the engineering requirements stated. The shelters shall be designed in accordance with the Uniform Building Code (UBC), Volume I, current edition, the National Electric Code (NEC), latest edition, and shall comply with the applicable rules and regulations of Occupational Safety and Health Administration (OSHA), Title 29, Chapter XVII, Part 1910. The foundation design calculations, and construction drawings shall display the printed name, signature, the professional seal and registration number, the state name or jurisdiction of issue of the registration displayed by the professional engineer responsible for the design. The specifications shall be complete and in the form necessary to include in a construction contract.

3.1.1 Information to be furnished by the Government.- The Government will furnish the following information:

(a) The dimensions of required floor space, floor to ceiling clear space, size of door openings, size and location of antenna cable or waveguide openings, etc.

(b) A typical site plan layout and a typical floor plan. (See Paragraph 3.1.9 Standard layouts.)

(c) Mechanical and electrical requirements, including electronic equipment nameplate data.

(d) Floor loads expected, including weight of equipment to be installed.

(e) Roof loads expected, in addition to snow loads, i.e., antennas, counterpoise, etc.

(f) Required clear space beneath the floor.

3.1.2 Work to be performed by the Government.- The following site work will be completed by the Government prior to the delivery of the shelter:

(a) Access road constructed.

(b) Concrete foundation constructed complete with contractor designed anchoring system.

(c) Site grading completed.

(d) Government-furnished power-line, underground or overhead, installed to the shelter location vicinity.

(e) Other site work completed.

3.1.3 Equipment to be furnished by the contractor.- Each ARSR-3 building complex furnished by the contractor shall be complete in accordance with all specification requirements and shall include, but not be limited to, the items tabulated below. Quantities to be furnished are as specified in the contract schedule.

(a) ARSR-3 equipment building consisting of four modules.

(b) Standby engine generator system installed in shelter.

3.1.4 Documentation to be furnished by the contractor.- Documentation for the ARSR-3 building complex shall be prepared and furnished by the contractor, complete, in accordance with all specification requirements, and shall include the items tabulated below. Submission times are as shown.

(a) Standard layouts--for ARSR-3 site, buildings, and equipment. Due within 90 days after contract award.

(b) Design/fabrication drawings and specifications--covering construction of the transportable buildings and installation of all electrical, mechanical, and engine-generator subsystem; also the sanitary, and water system interface connections. Due within 270 days after contract award.

(c) Construction drawings and specifications--covering the shelter foundations, grounding system, and utility connections, including interface with the antenna support tower. Due within 270 days after contract award.

(d) Mechanical and electrical systems handbook--covering the description, operation, and maintenance of the mechanical and electrical systems. Two handbooks shall be furnished with each system and additional quantities may be required as specified in the contract schedule.

(e) Calculations--covering all design calculations including design assumptions and parameters. Calculations shall be submitted with Items (b) and (c).

3.1.5 Work to be performed by the contractor.- The contractor shall be responsible for completing all work including but not limited to that stated below:

(a) Design, fabricate, and assemble the shelter.

(b) Install the required electrical power service entrance and specified electrical system.

(c) Install the required ventilation, heating, air conditioning system complete with the controls.

(d) Perform factory electrical/mechanical system check out.

(e) Prepare the shelter for shipment.

(f) Deliver the shelter to FAA site.

(g) Install the shelter on the Government-furnished foundation and secure the structure to the Government-furnished foundation (contractor to furnish all equipment, labor, and material for this activity).

(h) Complete the electrical power connection to the E/G power plant power entrance switch, and complete the power system for the complete facility.

(i) Check out the shelter electrical system.

(j) Check out the shelter mechanical system.

(k) Perform other acceptance requirements, make minor repairs, and clean up the site.

(l) Complete the acceptance inspection and turn over the shelter to the Contracting Officer's representative.

3.1.6 Interface.- The ARSR-3 building being procured by this specification is intended for use with an antenna support tower being designed under Specification FAA-C-2498. A building entrance door must mate with the enclosed tower stairway as required by the tower specification. The buildings will shelter the ARSR-3 transmitter/receiver system and all components and requirements described in Paragraphs 3.1 and 3.1.9. The contractor shall assure compatibility of the interface between components under his own design control and shall coordinate, through the Contracting Officer, to assure compatibility with components furnished by others.

3.1.7 Radar equipment building.- The transportable ARSR-3 building shall house all the components, including radar, beacon, microwave remoting, communications, and common digitizer equipment, test equipment, electrical, mechanical, sanitary, and water systems, storage facilities, work areas, etc., required for a complete, self-sufficient, dual-channel, long range radar transmitter/receiver facility. The radar equipment shall be installed in the building at the radar equipment contractor's plant. The radar equipment modules shall extend under the antenna support tower and mate with the enclosed tower stairway which encloses the vertical waveguide run. The modules shall be capable of installation under an erected tower. Water and sewer service connections shall be designed to prevent freezing by using electric heating tape and insulation from the frost line into the shelter and the drawings shall include details of the service connection to be installed.

3.1.8 Standby power system

(a) The contractor shall provide and integrate a complete standby engine generator (E/G) system, installed and tested in a transportable shelter in accordance with the requirements stated in Paragraphs 3.5.8 through 3.5.8.9.

(b) The shelter shall be designed for transportation from the contractor's plant to the field site with all major components of E/G and ancillary electro/mechanical equipment installed.

(c) The system shall include all fittings, plumbing, and accessory items necessary to make a complete operating unit capable of standby or continuous operations except for the underground fuel tank, to be installed by the Government.

(d) The E/G shelter shall be located a minimum of 10' from the ARSR-3 building. A rain cover shall be provided over the walkway between the two buildings. The walkway shall be included in the foundation designs.

3.1.9 Standard layouts.- The arrangements of building modules and the layouts of equipment in the modules shown on the sketches of Attachment 1 are examples of possible arrangements. The sketches are included herein to illustrate the general scope and relationships of the overall layout and serve as a base for the development and evaluation of the contractor's final layouts. The contractor is encouraged to propose changes and improvements to the layouts commensurate with final equipment configurations and state-of-the-art technology. The following minimum space and clearance requirements shall be included in the layouts:

(a) RML/RCAG Maintenance Space.- Area requirement is 10' by 5'6" to provide space for one each work bench 60" x 28", one each tool cabinet 29" x 20", one each mobile equipment cart 30" x 30", and one each work stool 2' x 2'.

(b) ARSR/Beacon Work Space (each channel).- Area requirements are the same as for RML/RCAG space. A mechanical lifter will occupy the 30" x 30" space in one channel, the mobile equipment cart in the other channel.

(c) Common Digitizer Maintenance Space.- Area requirement is 10' x 5'0" to provide space for one each work bench 60" x 28", one each locker 18" x 36" (plus door swing area), one each tool cart card tester 20" x 30" and one each work stool 2' x 2'.

(d) RCAG Storage Space.- One each cabinet, storage 18" x 36".

(e) Administrative Office Space.- Area requirements are 18' x 12' minimum. Shall provide space for the following:

1 each - Desk 60" x 34"

1 each - Swivel Chair 2' x 2' (plus free area)

1 each - Table 60" x 34"

1 each - Swivel Chair 2' x 2' (plus free area)

2 each - File Cabinets 15" x 30" (each), (plus drawer opening)

2 each - Lockers 18" x 36" (each), (plus door swing)

1 each - Blackboard 48" x 36", wall mounted

1 each - Safe 19½" x 28" (joint-use sites only)

2 each - Bookcase 13" x 33" (plus door opening)

1 each - Cabinet, Map and Plan 12" x 36"

(f) ARSR Storage Space.- Space required for the following items:

7 each - Storage Lockers, each occupying 18" x 36" (plus door swing area)

1 each - Broom and Pail Locker 15" x 30"

1 each - Bulk Storage Area 3' x 8'

1 each - Clothes Rack 20" x 30"

1 each - Heater, portable 15" x 15"

2 each - Chairs, Swivel 24" x 24" (approx.)

3 each - Stools 24" x 24" (approx.)

1 each - Vacuum Cleaner

NOTE: All items mentioned in Paragraphs (a) through (f) above are Government-furnished.

(g) Engine-Generator Equipment Clearances

36" sides of E/G

30" ends of E/G

24" for floor mounted switchgear

36" front of workbench

24" front of storage cabinet

30" front of batteries

18" front of bypass switch

(h) Government-Furnished Electronic Equipment.- Maintenance clearance of 3'-0" minimum is required in the front of electronic equipment.

	Wide	Deep	High	Weight
Common Digitizer				
Electronic Unit	66"	26"	78"	2000 lbs.
Console Unit	32"	50"	60"	580
RRDS/WFMU	22"	25"	76"	400
Beacon				
Interrogator (2 each)	25"	26"	76"	300
Defruiter	25"	26"	76"	300
Beacon Performance Monitor (Future)	22"	26"	78"	400
RML				
RF (2 each)	22"	22"	84"	350
MUX	22"	22"	84"	350
Battery Charger	22"	22"	84"	400
Batteries and Rack	36"	20"	43"	1200
Radar Performance Monitor				
Monitor Unit (Future)	22"	22"	36"	100
RCAG Backup System				
Transceiver Rack (2 each)	22"	22"	76"	350

(i) Space shall be provided in each room for placement of a wall mounted 15 lb. CO_2 fire extinguisher by the Government.

Six copies of the proposed layouts of the site, building and equipment shall be submitted to the Contracting Officer for approval within 90 days after award of contract. The interior layouts shall include all electronic and electro/mechanical equipment, power distribution panels, junction boxes, waveguide, cable trays, wireway and ductwork. Interior elevations shall be included, as necessary, to show wall mounted items

and openings. The site layout shall include foundations; all underground conduit, tanks, cables, and piping; relationship of all site structures; and space requirements for construction, erection, and installation of the buildings. All dimensions necessary for the evaluation of the layouts shall be included. Approval or required changes for the layouts will be transmitted to the contractor within 30 days after receipt.

3.1.10 Service conditions.- The equipment shall sustain the maximum stresses imposed by the following ambient service conditions without permanent deformation, damage, or degradation of operation.

Temperature	-50°C to +70°C
Relative Humidity	5% to 100% including condensation due to temperature changes
Wind Velocity	100 mph (not including gusts)
Roof Snow Load	40 PSF
Seismic	Zone 3 of Uniform Building Code
Environment	Hail stones - 1/2" diameter
	Salt Spray
	Urban industrial fumes
	Fungus - as encountered in warm, humid atmosphere
	Wind borne sand and dust - as encountered in deserts and plains of Western U.S.
	Rain
Safe Allowable Soil Bearing Pressure	4,000 PSF
Uniformly Distributed Loads	Dead Loads - Dead loads shall include the weights of the building components and the equipment permanently connected to the building.
	Live Loads - Floor live loads shall be 75 PSF over the areas not covered by the equipment.

Concentrated Loads	The floor shall be designed to support safely the uniformly distributed loads stipulated above or the concentrated load of 200 LBS whichever produces the greater stresses. The concentrated loads shall be assumed to occupy an area of 2½ square feet and shall be so located as to produce the maximum stress conditions in the structural members.
Dynamic Forces on the Equipment	The connections of the instruments and equipment shall be capable of isolating/absorbing the dynamic forces and vibrations resulting from the movements of the buildings as described in the above paragraph. The shock and vibration absorbing property of each connection shall be based on the load tolerance limitation of each instrument and equipment requiring protection. (NOTE: For building resistance to wind uplift forces, the weight of any heavy equipment which can be removed after the buildings have been erected in place shall be classified as "live loads." For purposes of calculating the overturning wind resistance of the building only the weight of the building with concrete foundation and 50% of the equipment weights shall be used.)

3.2 Architectural

3.2.1 Appearance.- The exterior of the buildings should have a modern commercial or light industrial appearance. The appearance should reflect the precision and reliability of FAA activities and the utilitarian quality of public financed construction. Some of the facilities will be sited in close proximity to residential areas. The exterior colors shall blend harmoniously with the antenna tower and radome and the general site layout. Interior wall and ceiling colors shall give the appearance of largeness and openness. Color and texture effects on heat transmission and reflectance shall be considered for exterior and interior selections, respectively. All painting shall be in accordance with FAA-STD-003. Samples of all colors, interior and exterior, including trims, shall be submitted to the Contracting Officer for approval.

3.2.2 Shape and size.- The ARSR-3 building system shall consist of five rectangular modules. The E/G shelter shall consist of one module having a clear inside width of not less than 10'-0". The interrelationships of the modules shall be designed by the contractor. The maximum clear width of a single module shall not exceed 12'-0", including minor protuberances, to facilitate over-the-road transportation. The

modules and nonremovable roof mounted appurtenances when loaded for truck transport, shall pass through a highway underpass having clearance of 13'-6". The minimum interior floor to ceiling height shall be 9'-0". The minimum interior head clearance shall be 6'-9" in work areas for personnel safety. With the exception of the E/G module, the minimum interior width of the module shall not be less than 11'-0" and the minimum interior length shall not be less than 39'-0".

3.2.3 Design criteria.- The buildings shall be designed in accordance with the Uniform Building Code, Volume 1, current edition. This specification shall take precedence over the Uniform Building Code in event of conflict. The buildings shall be designed for a 20 year useful life withstanding the environment and service specified herein. The buildings shall also be designed to withstand a subsequent relocation, with all equipment in place, after their initial field installation. The buildings shall be in accordance with all applicable requirements of Department of Labor standard, Title 29, Chapter XVII, Part 1910.

3.2.4 Materials.- Materials of construction are not limited by this specification, but they must be suitable for the intended application considering the building life, service conditions, and transport loads. The ultimate sites for these buildings may range from coastal environments with salt atmosphere to mountaintops with deep snow and severe icing conditions. Provision shall be made for prevention of corrosion; avoidance of unprotected faying surfaces, moisture traps, and galvanic couples due to contact between dissimilar metals; and proper selection and application of protective finishes. The building designs shall be such to keep maintenance to a minimum during the life of the buildings. All painting shall be in accordance with FAA-STD-003. The contractor shall use materials listed in the Uniform Building Code. Materials that are not listed in the Uniform Building Code may be used providing prior approval is obtained from the Technical Officer. Exposed steel members shall be hot dipped galvanized and no paint.

3.2.5 Fire resistance.- Materials used for building construction (hidden and exposed) shall be noncombustible or fire retardant. Noncombustible materials shall be determined in accordance with current ASTM Test for Determining Non-combustibility of Elementary Materials. Materials which are inherently fire retardant or have received a fire retardant treatment shall produce a flame spread rating of not more than 25 when tested in accordance with current ASTM Surface Burning Characteristics of Building Materials. The fire retardant treatment shall not be subject to degradation due to weathering or custodial operations such as cleaning, washing, etc.

3.2.6 Heat transmission.- The maximum heat transmission coefficient value throughout the roof, walls, floor, and door shall be 0.15 Btu/hr./sq. ft./^{o}F. Calculations of the actual heat transmission coefficient shall be submitted for the approval of the Contracting Officer. The calculations shall be in accordance with the methods and values shown in the latest issue of the Heating, Ventilating, and Air Conditioning Guide and Data Book (ASHRAE Guide).

3.2.7 Security

3.2.7.1 Locksets.- All exterior doors shall be provided with a cylindrical, key-in-knob, lockset equal to Model 7K7E6AUS10 manufactured by Best Universal Lock Co., Inc., Indianapolis, Indiana. The lockset shall be adaptable to the existing FAA key locking system provided by Best Universal Lock Co. The lock shall be provided with a construction core which will be replaced by the Government with a regular FAA core.

3.2.7.2 Protective lighting.- Protective lighting fixtures shall be mounted on exterior building walls in such a manner that a 40' wide zone around the building is illuminated with cones of overlapping light during the hours of darkness. The minimum level of illumination at the outer edge of the lighted zone shall be two footcandles.

3.2.8 Floor.- The floor shall be covered with 1/8" light green vinyl-asbestos tile conforming to Federal Specification SS-T-312. In the engine-generator spaces floor covering should be selected in accordance with Order 6900.6. The tile color shall be approved by the Contracting Officer. The floor tile adhesive shall resist degradation from exposure to solvents, oil, and diesel fuel. The mating and sealing of door openings between modules shall provide a surface suitable for the easy passage of wheeled equipment carts.

3.2.9 Roof.- The roof shall sustain the snow load and any roof-mounted equipment required by this specification or the Contract Schedule. If the contractor's design determines that rooftop maintenance is required, a rooftop work area shall be reinforced and protected for maintenance personnel. The portions of the roof which extend under the edges of the tower and radome shall be designed to withstand the impact and load of ice and snow falling from the tower and radome. Equipment may be removed from the roof during transportation and the opening made weathertight, if necessary, to meet transportation height requirements. A minimum 4 foot wide by 3 foot deep rain canopy shall be provided over each exterior personnel door. The canopy shall be detachable during transit. Roof access to the ARSR-3 building for maintenance personnel shall be gained from the enclosed antenna tower stairway.

3.2.10 Openings.- All openings for conduit, waveguide, duct work, etc., shall be provided in the walls of each module as necessary for system interconnection. Weatherproof covers shall be provided for each opening

and provision shall be made to maintain the insulation rating of the wall or floor if opening is not in use. A weatherproof closure shall be provided to seal around each conduit, waveguide, or cable that passes through a wall opening. Galvanized steel hoods with insect screens and filter holders (filter intake air only) shall be provided for all air intake and exhause openings. Hoods shall be detachable for transportation.

3.2.11 Doors.- Doors and walk-through openings shall be provided in each module and shelter as necessary for efficient and safe operation of the facility. Exterior doors shall be structurally sound, insulated, and impervious to the weather. The doors and door frames shall be metal. A minimum of three (3) hinges shall be required. Exterior doors shall open out and be equipped with a brass or bronze threshold and weather stripping to prevent dust and moisture entry. The minimum nominal door opening size shall be 3'-0" by 7'-2".

3.2.12 Transportation.- The contractor shall design a method of transportation and handlings for the building modules. The requirements of the specific techniques shall be included in the structural design of the modules. Lift points shall be provided on each module structure for the attachment or positioning of sling cables to facilitate lifting (loaded with electronic and mechanical equipment) to and from transport vehicles and onto the foundation. Lift points shall be permanently identified on the outside walls with 1/2 inch high letters of weld metal beads or letters recessed into a metal plate. The lift points are for the future use of the Government and are not required to be used for the initial installation. Over-the-road transportation may be on either a special trailer, flat-bet trailer, low-bed trailer, detachable dolly wheels or other means which meet ICC regulations for interstate transport in all states in the continental United States. The floor structure of the modules shall be designed for loading onto an 8'-0" wide trailer without special supports or pallets.

3.2.13 Data plate.- A nonferrous metal data plate, approximately 3 inches by 6 inches, shall be provided on the lower exterior surface of each module at the lock side of an exterior door so as not to be hidden by steps or foundation work. The data plate shall contain the following information in the order listed:

BUILDING, AIR ROUTE SURVEILLANCE RADAR (ARSR-3), TRANSPORTABLE OR (SHELTER, ENGINE-GENERATOR, TRANSPORTABLE)

Manufactured by (manufacturer's name) for

FEDERAL AVIATION ADMINISTRATION

Contract number: _____
Serial number: _____
Curb weight: _____ pounds
Gross weight, maximum: _____ pounds
Building Subcontractor: (if applicable) _____

Maximum gross weight is defined as the maximum possible weight of the building unit and its contents as described in Paragraph 3.1.4. Curb weight is defined as the building weight with only mechanical and electrical equipment installed. The manufacturer's name shall not be visible on the finished building except on the data plate.

3.2.14 Cupola.- A cupola shall be provided on the roof of each radar equipment module positioned over the klystron. Within the cupola a monorail and a motorized hoist shall be installed for lifting the klystron from the pulse transformer and lowering it to the floor in the center of the module. The monorail and hoist hardware shall be in accordance with the requirements of FAA-E-2483b.

3.2.15 Loading doors and platform.- A set of double doors and an exterior concrete loading platform shall be provided on the Common Equipment Module, Figure 6.1, Typical Site Layout. The double doors shall open out and swing back against the exterior walls to be secured by hooks provided. The platform shall be a minimum of 12' wide and 4' deep and with safety handrails on the 4' sides. The platform deck shall be at the same level as the module floor. The platform shall be designed for a minimum live load of 75 psf.

3.3 Structural

3.3.1 Design criteria.- Structural designs shall be in accordance with the Uniform Building Code, Volume 1, current edition. This specification shall take precedence over the Code in event of conflict. Special attention shall be given to the method of anchoring or attaching electronic equipment racks and electrical and mechanical components to walls, ceilings, and floors. Required openings through the walls, ceiling, and floors shall be designed to withstand expected dynamic and statis forces and reinforced, if necessary. Calculation shall be provided. Floor, wall, and roof surface materials shall not be used for support restraint or alignment of installed equipment without proof of the adequacy of the design. The floor system shall be designed to support a uniform live load, as determined by the contractor, based upon the maximum loads imposed by the equipment and personnel to be supported, recognizing that electronic equipment may be relocated within the building in the future. The ceiling shall be designed to support a uniform live load, as determined by the contractor, based upon dead load, snow load, wind load, and the maximum loads imposed by equipment mounted or suspended from the ceiling. Design loads shall be based on the service conditions of Paragraph 3.1.10. In no case shall the floor be designed for less than 75 psf. The floor system deflection due to all loads shall not exceed 1/360 of the spans. The structural design of the shelter shall provide lifting and anchor points, and method of connecting the floor, walls, and roof structures shall provide for all of the static and dynamic loads expected. The module and the mounting

hardware used to anchor the electronic equipment shall be designed to withstand the dynamic loads resulting from loading and unloading from a truck and loads from sudden starts and stops during transportation as well as movement over bumpy roads. The horizontal dynamic force shall be calculated assuming a panic stop by a truck/trailer moving 50 mph. The dead load of the module and all installed equipment shall be included in the dynamic design. The minimum vertical shock loading shall be 3"g" and the minimum lateral and longitudinal shock loadings shall be 1"g."

3.3.2 Foundation design.- The contractor shall design the most practical and economical foundation system to support the shelters that form the ARSR-3 facility. Standard foundation construction drawings and specifications shall be prepared in accordance with Standards FAA-STD-002 and 005. The foundation design shall take into account the resultant of all dead and live load reactions and shall be designed to resist twice the calculated overturning moment due to a 100 mph wind. The shelters shall be designed for installation on concrete foundation walls and footings and shall allow a minimum of 18" of clear space under the shelter for maintenance purposes. Ventilation shall be provided in this clear space (access area) beneath the floor and may also serve as entrance doors to the area for maintenance. These entrances shall be screened openings with hinged covers. A maintenance access door shall also be provided near the location of water and sewer service users. The E/G shelter does not require space below the floor for maintenance and may be installed on a concrete slab; the top of which shall be 6" above the finished site grade. An entrance landing (4' x 4' platform) and steps shall be provided for each exterior door. The maximum step riser height is 8" and the minimum width of the stairway is 36". Provisions shall be made to prevent roof water from running off at or into doorways or other openings. A concrete loading platform shall be provided in accordance with Paragraph 3.2.15. An allowable soil bearing pressure of 4,000 pounds per square foot shall be assumed for footing the design. The bottom of the footing shall be one foot below frost depth or a minimum of three feet whichever is greater, and shall be so noted on the drawing. Calculations shall be provided for all structural design work.

3.4 Mechanical

3.4.1 Air conditioning.- The contractor shall design and furnish an air conditioning system for the ARSR-3 building. The design shall provide an efficient and effective air conditioning system with reliability commensurate with the electronic equipment being cooled.

The design shall include a detailed technical, logistical, and economic analysis of the following alternatives and the contractor's recommendations.

(1) The use of a central plant system versus the use of individual systems for each building module. Either system shall have not less than two equal independent sections each sized to carry a minimum of 60% of the total cooling load in the event of the failure of the other.

(2) The use of three or more system sizes to meet outdoor design conditions throughout the continental United States versus the use of a single size system throughout the continental United States. The outdoor design condition parameters for the former shall be determined by the contractor and for the latter shall be 100°F DB and 76°F WB.

The analysis shall be submitted to the Contracting Officer for review and selection of the design alternative to be implemented by the contractor.

The air conditioning system shall maintain inside design conditions at 75°F DB and less than 50% relative humidity. The relative humidity should range between 40% to 50%. Equipment and installation shall be in accordance with FAA-C-2256. The air conditioning load shall be calculated in accordance with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Guide and Data Book and based on internal heat loads of electronic equipment in the normal mode of operation as well as any mechanical heat loads that might be within the conditioned space. Use building orientation which yields largest solar heat design conditions. Included in the internal heat load shall be all lighting fixtures illuminated, six occupants and transmission gains through roof, wall, and floor areas including solar load. Three basic zones may be considered, i.e., electronic, office, and mechanical/support environment. Provisions shall be made for redistribution and/or sharing of cooling in the event of A/C equipment failure.

3.4.1.1 Air filters.- All outside air entering building and return air where specified shall be filtered with throw-away type filters, not less than 1" thick. Filter face velocity shall not exceed 300 f.p.m.

3.4.2 Heating

(1) The contractor shall design, subject to FAA approval, electric heating to maintain an inside temperature of 75°F DB in the ARSR-3 building.

(2) No credit shall be taken for heat from electronic equipment. Three climatic areas of the United States shall be considered, in accordance with the ASHRAE "Guide," i.e., -20°F, 0°F, and +20°F. Use building orientation which yields coldest design conditions. Thermostats shall be located not less than four feet above the finished floor and in a position not subject to drafts. Consideration shall be given to rejecting the heat output of the klystron cooling equipments, into the antenna tower stairway enclosure during the winter.

3.4.3 Ventilation.- The contractor shall design emergency ventilation equipment in accordance with Specification FAA-C-2256 for the ARSR-3 building. The fans shall have sufficient capacity to limit the inside space temperature to not more than a 10°F rise above the outside ambient temperature. Propeller fans, if provided, shall conform to MIL-F-16081E, direct drive, wall mounting type equipped with gravity shutters. Relief air dampers shall be motor operated. Intake and exhause openings shall have weather hoods equipped with insect screens. The ventilators shall be covered with corrosion resistance screen of #8 mesh.

3.4.4 Controls.- Air conditioning, heating, and emergency ventilation controls shall be interlocked to prevent simultaneous operation. The emergency ventilation shall start operation when the inside space temperature exceeds 95°F. Emergency cycle controls shall lock in the ventilation cycle until necessary maintenance is performed on the air conditioning equipment. The air conditioners shall have individual adjustable start delay relays. The thermostat(s) shall be located in a position not subject to drafts or extreme temperatures and not less than four feet above the finished floor.

3.4.5 Plumbing.- The contractor shall provide a toilet facility and hot and cold potable water system for toilet and galley. The design and installation shall be in accordance with the National Plumbing Code ASA A40.8. The following minimum items shall be provided:

(a) Water closet.- The water closet shall be vitreous china, siphon jet, elongated bowl with low tank and fittings in accordance with Federal Specification WW-P-541/1. The seat shall be of wood composition, white in color, elongated, open front and without a cover in accordance with WW-P-541/1.

(b) Lavatory.- The lavatory shall be in accordance with Federal Specification WW-P-541/1 vitreous china, 20" x 18" with overflow and anti-splash rim. All exposed fittings shall be chrome plated.

(c) Toilet paper holder.- Toilet paper holder shall be in accordance with WW-P-541/8 roller mounted on two support brackets.

(d) Paper towel cabinet.- Cabinet for folded paper towels shall be in accordance with WW-P-541/8 style N surface mounted.

(e) Soap dish.- Soap dish shall be in accordance with WW-P-541/8.

(f) Medicine cabinet.- The medicine cabinet shall be in accordance with WW-P-541/8 surface mounted with swing door and mirror. The cabinet to be approximately 16" wide x 20" high x 3½" deep.

(g) Electric hot water heater.- An electric hot water heater shall be provided for supplying hot water to the lavatory and galley. The heater shall be a 20 gallon, Class 2, Type IV unit in accordance with W-H-00196G.

(h) Miscellaneous equipment and material.- Equipment and materials not specifically described shall be of good commercial quality.

A space shall be reserved near the water service entrance for the installation (by others) of a water system pressure pump and storage tank, if required by local conditions.

Provision shall be made for protecting the incoming water line and outgoing sewer line to a frost depth of 6 feet below grade.

3.4.6 Food service.- A galley shall be provided for self-help food service including a sink with hot and cold water, stove with oven, and refrigerator. The sink should be located near the toilet lavatory for economy of plumbing.

3.4.6.1 Sink.- The sink shall be a bar type, stainless steel, with dual-control nonsplash faucet. Minimum dimensions shall be 15" x 15" x 6" deep. The sink shall be built-in a cabinet base which provides storage space under the sink.

3.4.6.2 Stove.- The cook stove shall be electric with a thermostatically controlled oven. The stove shall be nominally 20" wide. There shall be one 8" and three 6" surface units. The oven shall have separate bake and broil units. The stove shall be listed with the Underwriters' Laboratories, Inc.

3.4.6.3 Refrigerator.- The refrigerator shall be a nominal 7 to 9 cubic foot free-standing household model with a minimum one cubic foot freezer compartment included. The refrigerator shall be in accordance with UL Std. No. 250.

3.4.6.4 Counter top.- Adjacent to the stove, a minimum four square foot, heat resistant, waterproof counter top shall be provided over built-in food storage cabinets.

3.4.7 Noise criteria.- Sound levels in the various work areas of the buildings shall not exceed the following limits (A-weighted):

Electronic Equipment Rooms	65 dBA
Office	50 dBA
Engine Generator Room	80 dBA slow response
Mechanical Equipment Rooms (includes A/D equipment coolant pumps, pressure pumps, etc.)	75 dBA

3.5 Electrical

3.5.1 General.- Electrical equipment shall be designed, sized, arranged, and furnished to accommodate all of the electrical power requirements of a complete ARSR-3 facility, including antenna system. The design shall be in accordance with the National Electrical Code and Specification FAA-1217.

3.5.2 Performance criteria.- The electrical system shall be designed to provide adequate power to all equipment and subsystems. Maintenance and repair to the electrical distribution system should be possible while deenergized and without causing total system outage or appreciably derogating the performance of the electronic subsystems. This electrical system shall, as far as practical, have a fail-soft characteristic similar to that of the electronic equipment it energizes. Short circuits and overloads shall be cleared at the lowest possible level in the system via proper coordination of circuit breakers and/or fuses.

3.5.3 Distribution system.- The Government will provide 120/208V, 60Hz, three phase, four wire, underground commercial power service to the facility. The service shall enter through an entrance switch located in the engine-generator shelter. The design of the electrical distribution system shall commence at the service entrance conduit and conductors as they enter the E/G shelter floor or wall and extend throughout the ARSR-3 facility, including the antenna system and support tower. Spare electrical capacity of not less than 20% of the design load shall be provided in the standby power system, the main distribution panelboard capacity, and distribution wiring; and proportionally assigned to each subordinate panelboard.

3.5.3.1 Panelboards and circuit breakers.- The following distribution equipment shall be provided on the load side of the engine-generator bypass switch.

(a) Main distribution panelboard with main breaker in ARSR building with surge suppressor connected to service immediately ahead of panelboard.

(b) Distribution panelboard in each building module for lights, outlets, mechanical equipment, etc.

(c) Radar distribution panelboard for each channel per FAA-E-2483b.

(d) Common digitizer distribution panel (located near CD)

			Breaker Size	Load
Electronic Units and Console	3Ø	208V	20 A	3.40KW
Card Tester	1Ø	120V	20 A	0.15KW
RRDS	1Ø	120V	15 A	0.20KW
WFMU	1Ø	120V	15 A	0.12KW
Convenience Outlets (2 circuits required)	1Ø	120V	15 A	
Spares (2 required)	1Ø	120V	15 A	

(e) Electronic equipment circuits (not to be combined in building service panelboards).

			Breaker Size	Load
Beacon Interrogator and Defruiter (max. 3 required)	1Ø	120V	20 A	
Interrogator Utility Outlet (2 required)	1Ø	120V	15 A	
Defruiter Utility Outlet	1Ø	120V	15 A	
Beacon Performance Monitor	1Ø	120V	15 A	0.43KW
Monitor Utility Outlet	1Ø	120V	15 A	
Narrow Band RML (2 circuits required)	1Ø	120V	30 A	3.15KW

			Breaker Size	Load
RML Utility Outlet (2 required)	1Ø	120V	15 A	
RCAG Back-up Transceiver (8 required)	1Ø	120V	15 A	0.50KW (each)
RCAG Utility Outlets	1Ø	120V	15 A	
Radar Performance Monitor	1Ø	120V	15 A	0.50KW
Spares (2 required)	1Ø	120V	15 A	

3.5.3.2 Wiring.- Wiring shall be provided in accordance with the National Electrical Code and FAA-C-1217. All wiring shall be run in raceway. Wiring diagrams and graphic symbols shall be in accordance with FAA-STD-002.

3.5.3.3 Outlets.- A 120V duplex outlet shall be provided at approximately 10' intervals on both longitudinal walls of each building and in each room of each module, above each workbench, and above the gallery countertop. All outlets shall be accessible after equipment installation. A 208V duplex outlet shall be provided above each workbench and identified in 1/2" high black letters.

3.5.4 Lighting.- Lighting levels and equipment shall be designed in accordance with the tasks to be performed in each area and the Illuminating Engineering Society Handbook and National Electrical Code criteria and requirements. The minimum level of illumination in any room of the ARSR-3 building shall be 50 footcandles and in the engine-generator shelter shall be 20 footcandles. Levels of illumination shall be measured at a horizontal plane 30" above the floor. Exterior illumination shall be provided at all doors for personnel safety. The light fixtures in each module or room shall be controlled by interior wall mounted switches located on the latch side of the entrance door. Electronic equipment areas, the E/G shelter, and the office shall have fluorescent type fixtures. Fixtures in electronic equipment areas shall be controlled in groups of four by wall switches and individually controlled at each fixture by pull type switches. Portable type Appleton Reelites, Catalog No. RE-7S26 Grounded, or equal, shall be furnished as required to provide work light in and around all electronic and mechanical equipment in the ARSR building and E/G shelter without pulling the light through building doorways.

3.5.5 Emergency lighting.- Rechargeable battery operated lights shall be provided in the engine-generator shelter in accordance with FAA Order 6950.9.

3.5.6 Grounding protection.- The building design shall provide three separate and distinct grounding subsystems for electronic equipment cabinets, electronic cable, and the electrical power system. Each separate grounding subsystem shall be connected together at a common point for attachment to the site earth ground. The engine-generator shelter shall have an electrical power grounding subsystem with facilities for attachment to the earth ground system. The site earth ground system shall interconnect all building, tower, and power system grounds including lighting grounds.

3.5.7 Ductwork, conduit, waveguide, and cable.- Wireways, raceways, ducts, and conduits shall be sized, arranged, and located to accommodate power conductors, and all coaxial and control cable required to provide a complete and usable system. Waveguide and electronic ductwork shall be located for optimum interconnection capability between equipment cabinets and modules. Design of the waveguide and duct runs to the antenna shall be coordinated with the antenna tower design. All necessary support hangers for the waveguide, waveguide switch and dummy load shall be included. Ductwork shall be wall or ceiling mounted for maximum accessibility. Power ducts shall be separate from the coaxial and control cable duct.

3.5.8 Standby power system.- All of the electric power requirements of the facility shall be automatically switched to the standby engine-generator system in the event of a commercial power failure.

The contractor shall provide a complete engine-generator standby power subsystem, integrated, installed, and tested in a transportable shelter. The E/G subsystems shall include all fittings, plumbing, and accessory items necessary to make a complete operating unit capable of standby or continuous operations except for fuel tank. The E/G subsystems shall be designed for transportation to the field site after being installed in the transportable shelter.

3.5.8.1 Major equipment to be provided

(a) Engine-generator set, 175KW Type I, Style I, Class A, including radiator, exhaust system, automatic transfer switch, and control equipment per Specification FAA-E-2204.

(b) Batteries, per Specification FAA-E-2204.

(c) Engine-generator bypass switch, Class I, per Specification FAA-E-2083.

(d) Load bank, per Specification FAA-1353 and Supplement No. 136.

The contractor shall validate the selection of a 175KW E/G unit and recommend a different size, if appropriate.

3.5.8.2 Fuel supply

3.5.8.2.1 Storage tank.- A 3,000 gallon underground fuel storage tank and fuel lines will be installed as part of the Government site preparation in accordance with applicable portions of Specification FAA-C-1244. The size of supply and return lines will be in accordance with the E/G manufacturers recommendations. The design shall include fuel lines terminated outside the shelter wall in a manner suitable for easy field connection.

3.5.8.2.2 Day tank.- If the auxillary fuel tank required by Paragraph 3.3.7.1.3 of Specification FAA-E-2204 is not furnished with the E/G set, a day tank (minimum 10 gallon capacity) with float valve and pump shall be provided. The day tank shall be able to overflow fuel into the underground storage tank at the full capacity of the supply pump.

3.5.8.3 Battery racks.- The design shall include steel battery racks coated with acid-resisting paint similar and equal to those specified in Specification FAA-C-1244.

3.5.8.4 Ventilation.- A thermostatically controlled fan and automatic louver shall be provided in the E/G shelter to maintain a $90^{o}F$ or less ambient temperature during engine operation or a $10^{o}F$ temperature rise above outside conditions during summertime engine operation. Openings shall be insect screened and weatherproof. Equipment and installation requirements shall be in accordance with Specification FAA-C-2256. The incoming air shall be filtered with throw-away type filters not less than 1" thick.

3.5.8.5 Heating.- Electric heating equipment shall be provided in the E/G shelter to maintain a space temperature of not less than $55^{o}F$ with an outdoor ambient temperature of $0^{o}F$. The thermostat shall be located in a position not subject to drafts or high temperatures, and not less than four feet above the finished floor.

For a supplemental electrical heater (by others), a 20 ampere 240 volt, grounded type, single outlet receptacle shall be installed 2'-0" above the floor at an accessible location. The receptacle shall be served from a 20 ampere breaker in the panelboard. The receptacle shall be labeled "208V HEATER," in 1/2-inch high black letters on the wall above the receptacle.

3.5.8.6 Radiator and load bank support.- The site foundation design shall include concrete support structures for the radiator and load bank.

3.5.8.7 Special architectural considerations.- Equipment shall be arranged to reserve floor space for a 36" x 18" storage cabinet (by others) and a 24" x 36" x 30" high workbenck (by others).

Doors or a detachable panel(s) shall be provided of sufficient width to allow straight-out removal of the E/G unit without disassembly of either shelter or unit. The doors or panels shall be completely weatherproofed with a metal opening frame and be secured from the shelter interior.

All adhesive used on the shelter shall not be degraded by exposure to fuel, lubricants, and solvents.

All mechanical connections, fasteners, and attachment methods used on the system and shelter shall withstand the vibrations of engine operation for the life of the facility. Periodic preventive maintenance shall be provided in the Mechanical and Electrical Systems Handbook.

3.5.8.8 Special electrical considerations.- The bypass switch shall be installed so the E/G and transfer switch can be isolated without interrupting power to the facility.

Cables and buses shall be sized to carry the full capacity of the generator in accordance with the National Electrical Code.

3.5.8.9 Remote indicators.- The contractor shall remote and display the following engine-generator performance indicators in the control module of the ARSR building.

(a) A green indicator lamp wired in parallel with the lamp specified in Paragraph 3.3.14 of Specification FAA-E-2204.

(b) Engine coolant temperature gauge (sensor shall be added to the E/G set).

(c) Engine lubricating oil pressure gauge (sensor shall be added to the E/G set.

(d) Ammeter wired in series with the ammeter on the E/G control panel.

(e) "Start-stop" pushbutton station or switch to manually start and stop the E/G set.

The remote indicators and controls shall be located together on a wall mounted panel in the ARSR building. The Government will provide an underground conduit for remoting wiring between the ARSR building and the E/G shelter. The contractor shall furnish, install, and connect the remoting wiring between the E/G set and the wall mounted display panel.

3.6 Documentation requirements

3.6.1 Drawings.- All drawings shall be made on clear-print paper No. 1000 H or equal with the FAA title block in the lower righthand corner. Provide 1/2" border lines on the top, bottom, and righthand side. Provide a 1½" border on the left side. The drawings shall be made on "D" size sheets (22" x 34"). Sample title and index sheets will be furnished. Drawings shall be prepared in accordance with FAA Standard, FAA-STD-002. These drawings will be reduced to one-half size by the FAA in the future. For this reason, the contractor shall take effort to assure that all drawings are clear and legible. The details and printing shall be of the size required for microfilming on 35mm film. The minimum letter height for a 22" x 34" sheet will be 5/32" and .05" spacing between letters. All letters shall be vertical capital letters. Proposed drawing titles and numbers shall be submitted to the Technical Officer for approval.

3.6.2 Specifications.- Specifications for the designs shall be prepared in accordance with FAA-STD-005. The drawings and specifications developed shall be complete to the degree that they can be subsequently used by the Government without modification as technical documents for inclusion in a Government contract for fabrication and construction. The specifications shall contain complete provisions for factory and on-site testing and acceptance.

3.6.3 Mechanical and Electrical Systems Equipment Instruction Book.- The equipment instruction book covers the description and operation of the mechanical and electrical systems of the ARSR-3 facility, including the antenna support tower and Government furnished equipment. The equipment instruction book shall provide a total systems overview including functions, descriptions, theory of operation, and the interface of each mechanical and electrical system. This shall be provided through the use of schematics, simple diagrams, and written descriptions. The equipment instruction book shall contain catalog cuts, technical information, and any other data that has been detailed in the specifications or on the drawings. The equipment instruction book shall include the following maintenance information.

(a) Standards and Tolerances.- including standard design parameters of the system, initial tolerances/limits, and operating tolerances/limits.

(b) Periodic Maintenance.- including performance checks, periodic maintenance, preventive maintenance, and all associated schedules.

(c) Maintenance Procedures.- including testing, measurement, adjustment, alignment, calibration, repair, and trouble shooting procedures required for accomplishing the various maintenance activities, both periodic and incidental, and any associated safety precautions.

The handbook shall be prepared in accordance with Specification FAA-D-2494. The manuscript copy shall be delivered 90 days prior to delivery of the first article model. The final handbook shall be delivered concurrent with the first article ARSR system.

3.7 Design submission and approval.- The contractor shall furnish the Contracting Officer three copies of the standard layouts, the building fabrication drawings and specifications, and the foundation drawings and specifications, also three copies of calculations necessary to support all design requirements contained herein. Design calculations shall include documentation for allowable stresses assumed and specifications for metal, fiberglass, plywood and epoxy resin composite materials included in the design. No fabrication work shall be started until all design documentation has been approved by the Contracting Officer. Approval or required changes for the initial submission will be transmitted to the contractor by the Contracting Officer within forty-five (45) days after receipt by the Government. Subsequent resubmissions will be returned within twenty-one (21) days. Design approvals shall in no way relieve the contractor from meeting the requirements of the specification.

3.8 Reliability and maintainability (R&M).- The contractor shall plan, implement, and conduct reliability/maintainability programs in consonance with MIL-STD-470 and MIL-STD-785A. The requirements of Paragraph 3.1.4 and subsidiary paragraph of FAA-E-2483b are applicable. The ARSR-3 radar system shall include in addition to those equipments listed in FAA-E-2483b and FAA-E-2496a, the electrical and mechanical equipments set forth in this specification. The reliability models depicted in Figures 2 through 4B of FAA-E-2483b shall be changed to include as a minimum the power, heating and air conditioning equipments set forth in Paragraph 3.4 and 3.5 and subsidiary paragraphs respectively in this specification and the requirements of Paragraphs 3.3.1 and 3.24 and subsidiary paragraphs of FAA-E-2483b.

3.8.1 Performance requirements.- The mean time between failure (MTBF) of the power, heating and air conditioning equipments as herein defined shall not be less than 75,000 hours. The mean-time to repair (MTTR) for the electrical equipment shall be 30 minutes. The MTTR for the mechanical equipment shall be two hours. Failure shall be defined for the electrical equipments and components as any excursion outside the allowable tolerances indicated in the appropriate specification. Failure for the heating, ventilating and air conditioning equipment shall be defined as any excursion outside the allowable inside design conditions (Para. 3.4 and subsidiary paragraph). The Government will consider relaxation of these requirements if failure mode and effect analysis show that the ARSR-3 performance requirements as shown in Paragraph 3.32.2.2 and subsidiary paragraph are not derogated.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality control provision.- The contractor shall provide and maintain a quality control program in accordance with FAA-STD-013. All tests and inspections made by the contractor shall be subject to Government inspection.

4.2 Documentation.- The contractor or his authorized representative shall sign the original tracings of all drawings and the first page of all specifications, design calculations, or similar documents under the contractor's printed name and over the affixed replica of his professional seal or his registration certification number including the state or jurisdiction of issue.

4.3 Buildings

4.3.1 Warranty.- The contractor shall provide a five-year warranty covering materials, workmanship and weatherproofing of the buildings and transfer this warranty to the Government at the time of final acceptance. All documents pertaining to warranties/guarantees of commercial items (heaters, circuit breakers, E/G, etc.) installed in the building shall be transferred to the Government at the time of final acceptance.

4.3.2 Visual and mechanical inspection.- The buildings shall be inspected for conformance to the fabrication drawings and specifications and the requirements of this specification. The inspection shall include, but not be limited to, workmanship, dimensions (including flatness and squareness), connections, missing parts, improperly installed parts, damaged materials, inoperative parts, damaged finishes, and parts not easily operable.

4.3.3 Electrical work.- All electrical wiring and equipment shall be inspected and tested in accordance with FAA-C-1217.

4.3.4 Temperature and humidity control equipment.- Heating, ventilating, and air conditioning equipment shall be inspected and tested in accordance with FAA-G-2256 except the sound level test shall be deleted. The contractor shall obtain a five-year warranty on the air conditioner compressor and coils and transfer the warranty to the Government at the time of final acceptance.

4.3.5 Noise test.- Noise level readings shall be taken with a sound level meter to determine compliance with the requirements of Paragraph 3.4.7. The positions of readings shall be located to measure the overall ambient noise levels which are experienced by a person performing normal activities in the buildings. The number and locations of test points shall be determined with the Contracting Officer's Representative prior to start of testing. The noise test shall be performed as a design qualification test on the first building complex produced at the contractor's plant.

4.3.5.1 Electronic equipment buildings.- Readings shall be taken at the point of highest noise level at a distance of 3'-0" in front of each equipment cabinet (doors closed) with all electronic equipment in a normal mode of operation and all air conditioner equipment operating. Readings shall also be taken at the point of highest noise level at a distance of 5'-0" from the surface of the air conditioning equipment while the electronic equipment is operating. Similar readings shall be taken with the ventilation systems in 100 percent outdoor air mode of operation while the electronic equipment is operating.

4.3.5.2 E/G buildings.- Readings shall be taken at the point of highest noise level at a distance of 3'-0" from both sides of the engine and the generator and the generator end of the unit while operating under normal load. A reading over the maximum limit at any test location shall be cause to fail the test for the entire building.

4.4 Engine-generator subsystem

4.4.1 E/G units.- All E/G units shall be inspected and tested in accordance with FAA-E-2204a. The type test and production tests shall be performed at the E/G manufacturer's plant and shall be observed and approved by the Contracting Officer's Representative with the following exception. The 14-hour break-in run required by Paragraph 4.2.2.1 of FAA-E-2204 shall be accomplished after each E/G Unit has been completely installed in its building. The break-in run may take place at the E/G manufacturer's plant, the prime contractor's plant, or the field installation site.

4.4.2 Bypass switches.- The bypass switches shall be inspected and tested in accordance with FAA-E-2083. The Government reserves the rights to observe and approve all type and production tests at the switch manufacturer's plant.

4.4.3 Load banks.- Shall be inspected and tested in accordance with FAA-1353 at the manufacturer's plant and observed and approved by the Contracting Officer's Representative.

4.4.4 Installation.- The complete standby engine-generator subsystem installed in a transportable building shall be inspected and tested in accordance with FAA-C-1244.

4.5 Reliability/maintainability tests.- The tests described in Paragraph 4.3.6 of FAA-E-2483b shall be expanded to include appropriate tests and demonstration of the power, heating, and air conditioning equipment.

5. PREPARATION FOR DELIVERY

5.1 Equipment.- The contractor shall be solely responsible for protecting, preserving, packing, and marking all equipment for delivery to field installation sites. The equipment shall arrive at the sites in full accordance with the requirements of this specification and acceptable for installation by the contractor or others.

5.2 Documentation.- The contractor shall be responsible for packaging, marking, and shipping all documents required by this specification to locations to be specified in the contract schedule or by the Contracting Officer.

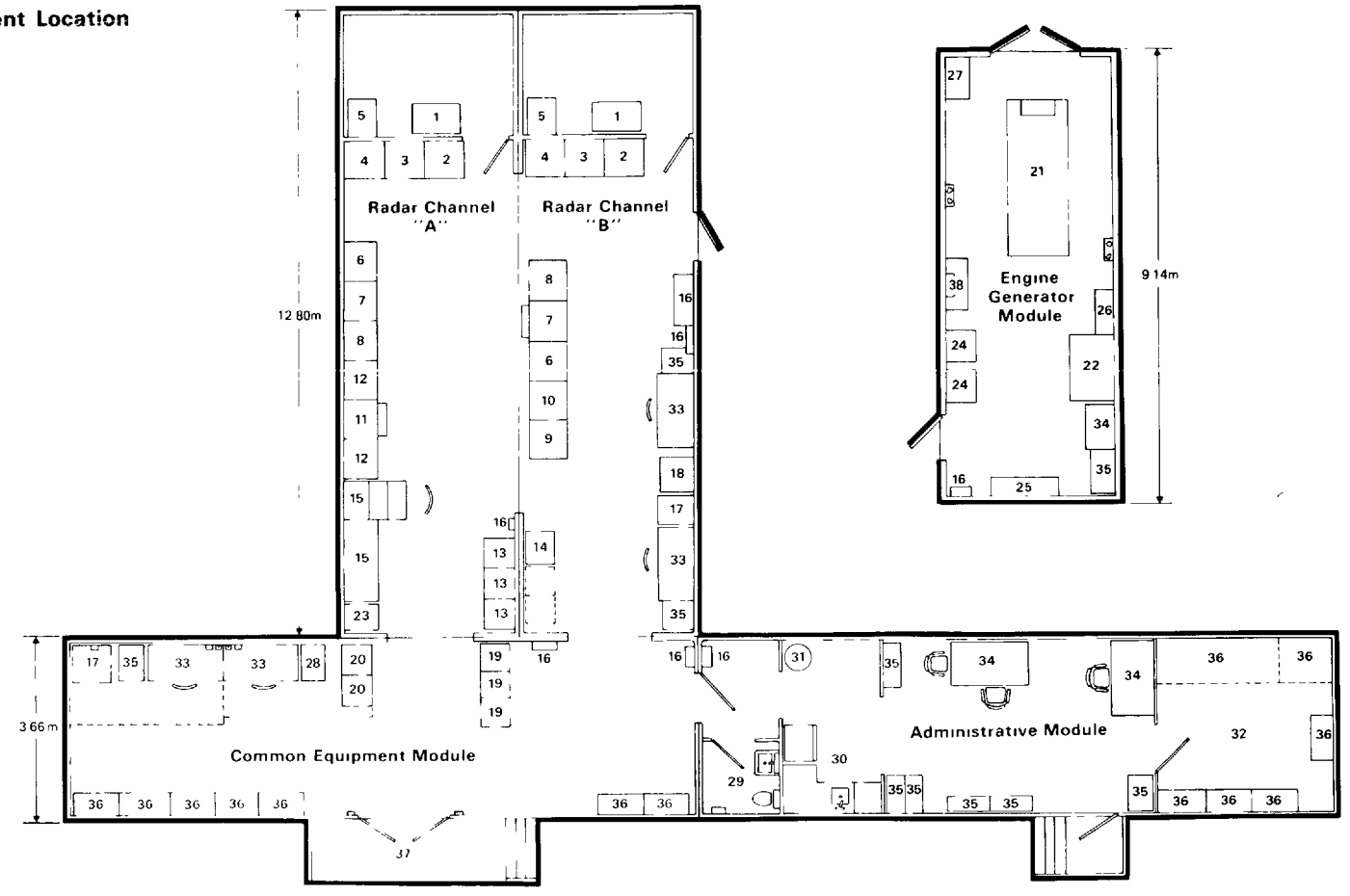
6. NOTES

6.1 Typical layouts.- Figure 6.1 portrays a typical building and equipment layout but is not a requirement of this specification. This sketch is furnished only as a matter of information to the contractor to assist him in visualizing a typical layout. The Government does not represent or guarantee that conformance thereto will insure that the resulting product will meet specification requirements. Any reliance which the contractor places on Figure 6.1 is solely at his own risk and shall not relieve him of his contractual obligation to comply with all of the requirements of this specification.

* * * * * *

For Figure 1, see page 32.

ARSR-3 Module and Equipment Location



Legend

1	Transmitter tube
2	Modulator
3	High Voltage power supply
4	Transmitter prime power
5	Uninterruptible power supply
6	Receiver cabinet
7	Receiver junction box and maint PPI
8	Digital Processor cabinet
9	Common equipment cabinet
10	System cable junction box
11	System control panel and Master PPI
12	Spares cabinet
13	Radar Beacon System equipment
14	Radar Beacon System test set
15	Common digitizer
16	Power distribution panel
17	Mobile equipment cart
18	Mechanical lifter
19	Radar microwave link
20	Communications transceivers
21	Engine Generator set
22	Control cabinet
23	Weather and fixed map unit
24	Channel A & B waveguide compressors
25	Prime power entrance and bypass switches
26	Load bank switch
27	Heat and ventilation unit
28	Electronic card tester
29	Lavatory
30	Galley
31	Hot water heater
32	Storeroom
33	Work bench
34	Desk
35	Storage cabinet
36	Storage locker
37	Loading platform
38	Battery and Charger

Figure 1, ARSR-3 Module and Equipment Typical Layout

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